

REMARKS

Favorable consideration and allowance of claims 13-26 are respectfully requested in view of the foregoing amendments and the following remarks.

Claims 13-26 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite due to instances of insufficient antecedent basis and conflicting claim language.

In the present Reply, Applicants amend claims 13, 16, 25 and 26, as described below. In claim 13, the feature of the two-way valve assembly “having two conduits” is added, and the feature of “without inserting additional valves” is removed. In claim 16, “a respective conduit” is replaced by “the conduits,” which has antecedent basis in claim 13. In claim 25, “the electronic unit” is amended to recite “the electronic controlling and regulating unit.”

Claim 26 is amended to recite a “first” pressure regulating valve included in the first conduit. As described in claim 26, the first conduit includes only one first pressure regulating valve, the second conduit includes only one second pressure regulating valve, and there is only one additional pressure regulating valve coupled with an input side of the first and second pressure regulating valves. Thus, the “only one” recitations of the claim refer to separate parts of the claimed structure. Accordingly, these limitations of the claim do not contradict each other.

In view of the foregoing, Applicants submit that claims 13-26, as amended, are definite.

Claims 13-22, 24 and 26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over GB 2270130 (Goebels) in view of US 6,371,573 (Goebels et al.); claim 23 was rejected under 35 U.S.C. § 103(a) as being unpatentable over GB 2270130 in view of US 6,371,573, and further in view of GB 2136521 (Goebels); and claim 25 was rejected under 35 U.S.C. § 103(a) as being unpatentable over GB 2270130 in view of US 6,371,573, and further in view of US 6,264,289 (Franke et al.). Applicants traverse the rejections as set forth below.

Claim 13 is amended herein to include the following features:

wherein the inserted solenoid control valve connects the control input of the respective relay valve with the compressed air reservoir for adapting the speed of rotation of a driven wheel, which initially slips during acceleration, to the speed of rotation of a non-slipping wheel, and the solenoid control valve assigned to a slipping wheel is controlled in a timed manner depending on the slip rate of the slipping wheel and a change in velocity of said wheel, whereby the solenoid control valve assigned to the slipping wheel is alternatively switched back and forth between a pressure buildup position and a pressure reduction position.

Support for these features of claim 13 can be found, for example, in paragraph [0043] of the substitute specification. The feature that the control of the solenoid control valve assigned to the slipping wheel is performed depending on the slip rate of the slipping wheel and the change in velocity of the slipping wheel clarifies the purpose of timing the solenoid control valve.

Applicants submit that the prior art fails to teach or suggest the above-mentioned features of claim 13.

Patent document GB 22 70 130 discloses a pressure regulator module for a motor vehicle pneumatic braking system for a wheel slip dependent controlling or regulating of braking pressures applied to two separate working connections, including a two way valve assembly having one relay valve for each conduit. According to the embodiment of GB 22 70 130 disclosed in Fig. 2a, which is cited in the Office Action, a proportional valve is associated with each relay valve as a control valve. Thereby, the electronic circuit for controlling such a proportional valve is provided as a rather complicated electrical regulating circuit. Furthermore, the construction of the proportional valve is very complicated and expensive. GB 22 70 130 includes no description or indication with reference to Fig. 2a, if and how a wheel slip control system (ASR) would be realized.

The only embodiment designated as suitable for wheel slip control in GB 22 70 130 is the embodiment according to Fig. 1. This embodiment operates with two control valves 9 and 12 inserted in front of the solenoid valves 7 and 8. For wheel slip control, this means that for interferences with the brake system independent from the wishes of the driver, the solenoid valve 12 is initially switched, so that no more pneumatic control signals can be provided to the solenoid valves 7 and 8 via the control conduit 13, but only reservoir pressure via the conduit 17. As disclosed on page 13, line 25 – page 14, line 3 of GB 22 70

130, the respective solenoid valve 7 or 8 is not being timed during wheel slip control operation, but only controlled, so that it prevents the compressed air from being supplied to the pneumatic control input of the respective solenoid valve. A person skilled in the art interprets this as switching the solenoid valve once, and leaving it in this switching position.

Furthermore, in the embodiment disclosed in Fig. 1 of GB 22 70 130, four solenoid valves with respective piping or electric wiring are being used, which requires a relatively high manufacturing and assembly effort.

It is an object of the present invention to refine a pressure regulator module such as that disclosed by GB 22 70 130 with a wheel slip control system according to the embodiment of Fig. 1, so that it can be manufactured in a more simple and cost effective manner. This object is accomplished according to the invention in which

a respective solenoid control valve in the form of a 3/2-way valve having two switching positions is assigned to the control input of each relay valve;

wherein the solenoid control valves, together with only one additional inserted solenoid control valve coupled on an input side of the module, connect the control input of the respective relay valve with at least one of a bleeding system, a control pressure, and a compressed-air reservoir;

wherein the inserted solenoid control valve connects the control input of the respective relay valve with the compressed air reservoir for adapting the speed of rotation of a driven wheel, which initially slips during acceleration, to the speed of rotation of a non-slipping wheel, and the solenoid control valve assigned to a slipping wheel is controlled in a timed manner depending on the slip rate of the slipping wheel and a change in velocity of said slipping wheel,

whereby the solenoid control valve assigned to the slipping wheel is alternatively switched back and forth between a pressure buildup position and a pressure reduction position.

Compared to GB 22 70 130, the invention claimed in claim 13 proceeds on an exactly opposite path by controlling the two solenoid control valves (e.g., elements 10 and 12 in FIG. 1) inserted in front of the two relay valves (e.g., elements 6 and 8 in FIG. 1) in a timed manner for realizing wheel slip control. Thus, claim 13 only requires three solenoid valves instead of four solenoid valves, as in GB 22 70 130, for realizing wheel slip control.

In view of the foregoing, Applicants submit that claim 13 is patentable over the prior art. Claims 14-25 are patentable due to their dependence from claim 13.

Additionally, a close examination of the cited prior art documents does not lead to the result that the invention is made obvious through a combination of GB 22 70 130 and US 6,371,573. The embodiment according to Fig. 7 of US 6,371,573 relates to a braking system, in which the 3/2 way valve 55 connects the control pressure of the brake valve 61, in case of an ABS in a timed manner, to the control input of the relay valve 57 (See column 8, lines 8 to 15: "...only in the control line...").

If these teachings are transposed to the embodiment according to Fig. 1 of GB 22 70 130, the solenoid valve 12 or the solenoid valve 9, which are integrated and inserted into the pneumatic control line 13, which is run from the operating

brake valve, would have to be controlled in a timed manner. This, however, does not lead to the invention.

In a wheel slip control system, controlling the brake pressures is performed independently from the control pressure generated by the operating brake valve. According to the invention, consequently not the control pressure generated by the brake operation valve, but a reservoir pressure originating from a compressed air reservoir, is connected to the control input of the respective relay valve in a manner timed by the solenoid valves, which constitutes a substantial operational difference.

Timing the reservoir pressure for providing wheel slip control through two 3/2 way valves, however, is not known in the state of the art. Thus, the assertion that it would have been obvious to combine the teachings of U.S. 6,371,573 with GB 22 70 130 is based on an impermissible hindsight reconstruction. Therefore, claims 13-25 are patentable over the prior art for this additional reason.

Claim 26 is amended to include the same features added to claim 13 (i.e., "wherein the inserted solenoid control valve connects ... and a pressure reduction position"). Applicants submit that claim 26 is patentable for reasons analogous to those for claim 13.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

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If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #037068.55856US).

Respectfully submitted,

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